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INFLUENCE OF SEASON AND N, P AND K NUTRIENTS ON THE GROWTH AND FLOWERING OF MS 51 41 A AND THE YIELD OF KM 2 BAJRA HYBRID SEED*

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Field experiment conducted during summer and winter seasons of 1979, revealed that (i) application of N significantly influenced the period of flowering, plant height and number of productive tillers; (ii) application of P resulted in significant differences in the flowering period and number of productive tillers; (iii) K application increased the plant height and number of productive tillers in the winter season only; (iv) the optimum doses of N, P and k for obtaining maximum yield of quality seed was 100, 50 and 50 kg/ha, respectively and (v) the yield of seed was higher from the winter than from the summer crop.

Seed yield is complex character and influenced by a number of both external and internal factors. Among the external factors, availability of nutrients play a major role (Agrawal, 1980). Though considerable work has been carried out with commercial crop, information on the effects of nutrients on a seed crop of bajra is very meagre. Therefore, it becomes imperative to undertake studies on this aspect and make available the information thus obtained to the seed growers as quickly as possible.

MATERIALS AND METHODS

Field trials were laid out adopting split-plot design, replicated three times, during summer and winter seasons of 1979. Application of N (0, 100 and 200 kg/ha) and P (0, 50 and 100 kg/ha) was taken as the main-plot treatments and of K (0, 50 and 100 kg/ha as the sub plot treatment. The planting ratio adopted was 5 : 1 (5 lines of the female, MS 51 41 A : 1line of the male, K 560 D 230). The experimental area was surrounded by four rows of male line as border rows. The seeds were dibbled adopting a spacing of 45 cm x 15 cm. The crop was thinned to maintain one plant per hill between 18 and 20 days after sowing. The recommended cultural and plant protection measures were followed. In each treatment and replication, the observation on the number of days taken for 50 per cent flowering was recorded. At maturity, the plant height and the number of productive tillers per plant was counted in five plants. Ear heads from each plot were har-

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vested, dried and threshed separately. After cleaning, the seeds were dried to uniform moisture content of 10 to 11 per cent and weighed. The hybrid seed yield recorded from the individual plots were computed and expressed as kg/ha.

RESULTS AND DISCUSSION

The number of days to 50 per cent flowering has been significantly influenced by the application of N, P and K. Aswathaiah (1977) arrived at similar conclusions in the parental lines of x4 hybrid bajra. The flowering was earlier by 1.3 and 1.7 days in summer and 2.3 and 3.7 days in winter in N_1 and N_2, respectively than in N_0 (Table 1). The significant interaction between N and P in winter and between N and K in summer season would indicate that availability of N was more important than P or K. Krishnasamy and Ramaswamy (1979) reported significant response to the interaction of NK in the parents of CSH 5 hybrid sorghum. Delayed in flowering in winter and early flowering in summer is in conformity with the results reported by Aswathaiah (1977).

Application of N in both the season and of P and K in winter season alone had significantly influenced the plant height (Table 2). Active absor-

Table 1. Influence of N, P and K nutrients on days to 50 per cent flowering in summer and winter seasons in MS. 5141 A.

	K_0			K_1			K_2			P_0	P_1	P_2
	P_0	P_1	P_2	P_0	P_1	P_2	P_0	P_1	P_2			
						Summer						
N_0	57	55	54	56	53	52	56	52	54	56	53	53
N_1	56	53	52	55	52	52	55	51	52	55	52	52
N_2	56	51	51	55	51	51	56	52	52	55	51	51
						Winter						
N_0	60	57	55	58	56	56	58	56	56	59	56	56
N_1	58	54	53	53	52	52	57	53	52	58	53	53
N_2	55	52	52	55	52	52	55	52	52	55	52	52

CD (P=0.05)		Summer	Winter
N		0.4	0.4
P		0.4	0.4
K		0.3	NS
N x P		NS	0.5
N x K	Comparison of N in K	0.4	NS
	Comparison of K in N	0.6	NS
P x K	Comparison of P in K	0.4	NS
	Comparison of K in P	0.6	NS

ption and metabolism of nitrogen resulted in increase in height of rice plant (Tanaka and Navasero, 1964). Increased plant height recorded in summer is in agreement with the findings of Aswathaiah (1977).

The number of productive tillers per plant varied significantly due to the levels of N and P in both the seasons and of K in winter season alone (Table 3) Similar results have been reported by Aswathaiah (1977). N at 200 kg/ha recorded the highest number of productive tillers. Nitrogen application promotes synthetic activity causing increase in tillering (Osada and Murata, 1962). The formation of more number of tillers in winter than in summer may be due to the formation of more scondary tillers during that season (Godbole, 1926).

The hybrid seed yield differences were significant for N and P in both the seasons (Table 4). According to Harrington (1960), a positive and significant correlation was observed between the yield and the levels of nitrogen applied. The high seed yield in N_2 treatment might be due to the formation of more number of productive tillers per plant. The increase in hybrid seed yield was significant

Table 2. Influence of N, P and K nutrients on height of plant in summer and winter seasons in MS. 51 41 A.

	K_0			K1			K2			P_0	P1	P2
	P_0	P1	P2	P_0	P1	P2	P_0	P1	P2			
						Summer						
N_0	100.7	94.4	94.8	104.0	100.1	97.2	96.9	94.6	104.6	100.5	96.4	98.9
N1	104.6	113 7	108.9	101.4	110.8	110.0	105.6	114.4	112.2	103.9	113.0	110.4
N2	116.7	114 0	112.7	108.0	109.5	112.8	112.4	110.8	108.9	112.4	111.4	111.5
						winter						
N_0	81.1	91.1	93.1	86.8	92.0	89.5	87.9	92.5	89.0	85.5	91.8	90.5
N1	88.4	97.5	99.9	91.0	102.3	99.4	91.7	103.9	102.3	90.4	101.3	100.5
N2	90.3	101.3	103.3	88.5	102.4	104.1	88.0	102.0	101.7	88.9	101.9	103.0

CD (P=0.05)		Summer	Winter
N		6.76**	3.58**
P		NS	3.58**
K		NS	0.64**
N x P		NS	NS
N x K	Comparison of N in K	3.07*	1.12**
	Comparison of K in N	7.22*	3.69**
P x K	Comparison of P in K	NS	1.12**
	Comparison of K in P	NS	3.69**

upto 100 kg/ha only. Deosthale *et al.* (1972) reported that increase in the quantity of N beyond the optimum level decreased the yield considerably. In the present study, the response to N application was comparartively more in winter than in summer.

Table 3. Influence of N, P and K nutrients on the number of productive tillers per plant in Summer and winter seasons in MS. 51 41 A.

	K0			K1			K2			P0	P1	P2
	P0	P1	P2	P0	P1	P2	P0	P1	P2			
						Summer						
N0	3.4	3.6	3.7	3.5	3.8	3.8	3.7	3.4	3.7	3.5	3.6	3.7
N1	3.7	4.9	5.0	3.8	5.3	5.3	4.3	5.3	5.3	3.8	5.2	5.2
N2	5.2	5.1	5.3	4.8	5.1	6.4	4.7	5.1	5.4	4.9	5.1	5.7
						Winter						
N0	5.2	4.6	4.3	4.9	5.3	4.5	4.7	5.2	4.5	4.9	5.0	4.4
N1	5.6	9.1	8.2	5.5	7.6	8.5	7.0	9.1	9.5	6.0	8.6	8.7
N2	5.6	8.7	8.5	6.9	8.8	8.7	6.7	9.1	9.3	6.4	8.9	8.8

CD (P=0.05)		Summer	Winter
N		0.5**	0.6**
P		0.5*	0.6**
K		NS	0.5*
N x P		NS	1.1*
N x K	Comparison of N in K	NS	NS
	Comparison of K in N	NS	NS
P x K	Comparison of P in K	NS	NS
	Comparison of K in P	NS	NS

Table 4. Influence of N, P and K nutrients on hybrid seed yield in summer and winter seasons

	K0			K1			K2			P0	P1	P2
	P0	P1	P2	P0	P1	P2	P0	P1	P2			
						Summer						
N0	1582	1770	1918	1424	1330	2120	1646	1528	1795	1551	1543	1944
N1	930	2817	2575	1182	2585	2037	1261	2886	2209	1125	2762	2274
N2	1518	2397	2453	1962	2150	2461	1745	2590	2071	1742	2379	2328
						Winter						
N0	1804	1948	2165	1691	1695	2190	1660	1822	1973	1719	1822	2109
N1	1465	2684	2583	1693	2527	2214	1737	2804	2323	1632	2672	2373
N2	1855	2512	2512	2072	2303	2502	1948	2594	2229	1958	2471	2415

CD (P=0.05)	Summer	Winter
N	372**	48**
P	372*	48**
K	NS	NS
N x P	NS	83
N x K Comparison of N in K	NS	NS
Comparison of K in N	NS	NS
P x K Comparison of P in K	NS	NS
Comparison of K in P	NS	NS

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